TABLE OF CONTENTS

Chapter 2:

SECTION TWO: MANAGEMENT PLAN

SECTION THREE: CITATIONS AND APPENDICES

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

The following acronyms are used in the text and citations of the Lynx Habitat Management Plan:

BC	British Columbia
DEM	Digital Elevation Model
DNR	Washington Department of Natural Resources
FRIS	Forest Resource Inventory System
FVS	Forest Vegetation Simulator
GIS	Geographic Information System
LAU	Lynx Analysis Unit
LHR	Lynx Habitat Ratio
LMZ	Lynx Management Zone
PHS	Priority Habitats and Species Program
SNAP	Scheduling Network and Analysis Program
US	United States
USDI	United States Department of the Interior
USFS	United States Forest Service
USGS	United States Geological Survey
USFWS	United States Fish & Wildlife Service
WARIS	Washington River Information System
WAU	Watershed Analysis Unit
WDFW	Washington Department of Fish & Wildlife
WDW	Washington Department of Wildlife
WRIA	Watershed Resource Inventory Area

ACKNOWLEDGMENTS

MANAGEMENT TEAM

Kaleen Cottingham, *Department Supervisor*
Art Stearns, *Deputy Supervisor*
Wes Culp, *Northeast Region Manager*
Roy Henderson, *Northeast Region Assistant Manager*
Bob Anderson, *Northeast Region Loomis Landscape Plan Overall Manager*
Michael Perez-Gibson, *Resource Planning and Asset Management Division Manager*
Lenny Young, *Scientific Section Assistant Division Manager*
Chuck Johnson, *Highlands District Manager*
Ron King, *North Columbia District Manager*
Bob Coon, *Forest Resources Division Assistant Manager (retired)*

PRINCIPAL AUTHOR

Cheryl Quade

OTHER AUTHORS

Dr. Richard Bigley
Lenny Young

CARTOGRAPHY

Kris Jamison

TECHNICAL SUPPORT

Paul Baines, *forestry*
Bill Bidstrup, *forestry*
Richard Bigley, *silviculture*
Christi Fisher, *forest engineering, lead modeler*
Charlie Hanlin, *forest engineering*
Arne Johnson, *forestry*
Al Lang, *forestry*
Fred Martin, *silviculture*
Mark Mauren, *planning*
Jeff Pebworth, *wildlife biology*
Jim Ryan, *hydrology*
Pat Ryan, *forestry*

OTHER EDITING AND REVIEW

Lisa Burley — Sabra Hull
Karen Ripley — George Wilhere

REVIEW

Dr. Theodore Bailey, *Univ. of Alaska*
Mitch Friedman, *Northwest Ecosystem Alliance*
Brian Gilbert, *Plum Creek Timber Company, LP*
Dr. James Hallett, *Washington State Univ.*
Carl Hruska, *Colville Confederated Tribes*
Dr. Lloyd Keith, *Univ. of Wisconsin, retired*
David Kellyhouse, *Alaska Depart. of Fish & Game*
Garth Mowat, *Lethbridge Community Coll. (Univ. Alberta)*
Robert Naney, *U.S.F.S., Okanogan National Forest*
Dr. Mark O'Donoghue, *Univ. of British Columbia*
Dr. Timothy Quinn, *Boise Cascade Co.*
Dr. Gary Roloff, *Boise Cascade Co.*
Bill Ruedigger, *U.S.F.S., Endangered Species Program, Northern Rockies Region; Western Forest Carnivore Committee*
Mark Skatrud, *Friends of the Loomis Forest and Loomis Citizen's Advisory Committee*
Brian Slough, *Yukon Renewable Resources*
Winthrop Staples, *Univ. of Alaska*
Dr. Sylvia Thorpe, *Loomis Citizen's Advisory Committee*
Dr. Stephen West, *Univ. of Washington*
Dr. John Weaver
Dr. Michael Wolfe, *Utah State Univ.*

Participants of the Washington Interagency Lynx Committee and Western Forest Carnivore Committee and attendants of the 8th Northern Furbearer Conference provided additional discussions and input.

WASHINGTON DEPART. OF FISH & WILDLIFE REVIEW

Harriet Allen — Dave Brittell
Dan Guy — Don Haring
Dr. Gary Koehler — Tracy Lloyd
Steve Pozzanghera — Michelle Tirhi

OTHER INPUT AND HELP

Julio Delmante — Nonie Hall
Roger Huestis — Jack Hulsey
Deb Lindley — Ken Russell
Ken Schlichte — Carrie Wolfe

DOCUMENT COVER

Von

MANAGEMENT SUMMARY

Lynx are currently listed as "threatened" in the state of Washington. Located on the southern margin of the lynx's trans-North American distribution, the areas occupied by lynx in Washington represent one of two places where reproducing populations exist south of Canada.

The Washington Department of Natural Resources [DNR] manages 5% of the primary lynx habitat in Washington, including some land in each of the six areas of current lynx range defined by the Washington Department of Fish and Wildlife's [WDFW]. Hereafter, these areas will be referred to as Lynx Management Zones [LMZ]. Most (75%) of this land is in the Okanogan LMZ, within DNR's Loomis State Forest. This plan outlines DNR's commitment to incorporate lynx habitat associations into its timber management plans, within DNR's legal mandate to provide revenue for trust beneficiaries. This plan also responds to the opportunity provided to DNR by the Washington Forest Practices Board to develop a special wildlife management plan pursuant to WAC 222-16-080 (2) in lieu of the Board developing rules to protect lynx habitat under the critical wildlife habitat designation.

DNR's lynx habitat management plan adopts a hierarchial approach to accommodate the multi-scaled habitat needs of lynx. The four scales are 1) Ecoprovince/Ecodivision, 2) Lynx Management Zone, 3) Lynx Analysis Unit, and 4) Small Ecosystem/Ecological Community. The scale and focus for most management direction is WDFW's Lynx Analysis Unit [LAU]. Where DNR manages less than 20% of an LAU, guidelines for the other scales will be applied to maintain the habitat quality of these areas.

Ecoprovince/Ecosystem

At larger scales, habitat connectivity issues are incorporated to benefit both resident and non-resident lynx. A system of travel routes will be maintained along major ridges, saddles, and streams to connect DNR-managed lands with neighboring lynx habitat throughout the LMZ. A special management zone will straddle the route so that a corridor at least 330 feet (100m) wide is available to lynx at all times. On average, the forested zone along the travel route will likely be much wider. Actual boundaries of the zone straddling the travel route will reflect the existing contours of the landscape.

Where the travel route is naturally forested, forested habitat conditions will be encouraged. If harvest activities must occur within the zone, openings will be minimized (<330 feet or 100m) wide), techniques to ensure regeneration will be employed, and forested areas will be left to provide lynx with alternative travel routes. If a road must be placed on ridges or saddles due to slope stability or water quality concerns, road width will be minimized, vegetative cover will be encouraged on both sides of the roads, sight distance will be reduced (<330 feet or 100m wide), and/or the road will be closed to vehicles as soon as possible. At the least, frequent use of such roads will be discouraged.

Lynx Management Zone
Harvest units on DNR-managed lands in critical positions within LMZ, such as in narrow constrictions or near the British Columbia border, will be designed to promote connectivity within the LMZ.

Lynx Analysis Unit
At the LAU-level, habitat ratios and dispersion guidelines reflect the habitat needs of individual or family groups of lynx (Chapter 3). The ratios are based on maintaining the quality of each of four LAUs where DNR manages at least 20% of the area. The strategy emphasizes providing habitat for snowshoe hare, as lack of prey is currently considered the limiting factor for lynx in Washington (WDFW 1996). Also, an overall habitat quantity ratio (total forested habitat) is given to limit temporary loss of habitat for lynx and hare resulting from the creation of new Forage (prey) habitat. Denning Habitat and den site ratios are also prescribed to provide lynx with denning opportunities through time. The ratios for DNR-managed lands are as follows:

Lynx Habitat:	**Forested Habitat**	70% minimum
	Temporary Non-lynx Areas	30% maximum
Within Forested Habitat:	**Forage Habitat**	20% minimum
	Denning Habitat	10% minimum
	Den sites	≥2 sites/square mile

The habitat ratios are based on the total acres of potential forested lynx habitat per LAU (total LAU acres minus permanent natural openings and sparsely forested areas that cannot be managed as lynx habitat).

Management attention is also focused on the configuration of habitat components to ensure connectivity at the LAU scale. Forage Habitat will be connected to other forested habitats, so that it is adjacent to or near (<3 miles) Denning Habitat. More than 50% of the periphery of Denning Habitat will be bordered by forested habitat at all times to avoid isolation of Denning Habitat. Finally, human-related disturbance will be minimized with road and harvest plans. Examples include rehabilitation of non-essential roads after harvest, gate placement to limit vehicular access (including snowmobiles), and avoidance of loop roads.

Small Ecosystem/Ecological Community
Smaller scale guidelines are provided to enhance the quality of Forage and Denning Habitat within the LAU, regardless of the proportion managed by DNR. Specifically, harvest units will

be designed to promote swift vegetative regeneration and snowshoe hare/lynx recolonization. Unit size and shape will reflect and enhance the regeneration capacity of the site, provide a diversity of forage and browse opportunities for the lynx and hare, and contribute to a diverse mosaic of habitat patches available to snowshoe hare and lynx. Unit composition will provide opportunities for rapid hare recolonization by containing clumps of vegetation and/or slash within harvest units. Regeneration techniques will reflect the unit's potential to produce quality hare habitat (according to vegetation association) and may involve use of fire or soil scarification techniques.

Quality winter snowshoe hare browse and cover within Forage Habitat will be maintained by providing horizontal cover densities >40% cover for at least 3.3 feet (1m) above average snow level using a vegetation profile board according to Nudds (1977). Browse and cover will be provided by tree species preferred by snowshoe hares, if preferred species are identified for the area. Otherwise, regeneration efforts will focus on creating the cover preferred by hares, rather than the species (Ferron and Oulette 1992). Thinning, partial harvests, lopping, or other treatments will be considered to prolong forage conditions and/or to create forage opportunities in understories of mature stands.

The highest priority denning habitat will contain known lynx den sites. WDFW will provide the locations of known lynx dens to ensure that sites which currently or historically supported lynx dens are protected. Stands that contain suitable den sites such as deadfall arranged to provide structural diversity 1-4 feet (0.3-1.2 m) above ground will be maintained as potential Denning Habitat. Preference will be given to stands that: a) possess all or most of the structural elements of Denning Habitat, b) contain more than one den site, and c) are mature to over-mature stands of spruce/fir or similar mesic association with north or northeast aspects. Potential human related disturbance to Denning Habitat will be minimized by locating these sites as far from roads as practical, where DNR manages more than 20% of a LAU (goal: distance between roads and den sites is >¼ mile, WDFW 1996).

To ensure that den sites are available across the landscape, two den sites per square mile will be provided. These sites may overlap with the Denning Habitat identified in LAU's where DNR manages at least 20% of the area. If so, the sites will be situated in stands of at least 5 acres, following WDFW (1996). Priority for den sites will be 1) known den sites, 2) den sites within current Denning Habitat, and 3) den sites within other habitat types. If no existing denning structure can be found, den sites may be artificially constructed. DNR wildlife biologists will coordinate with WDFW to survey existing den sites and recommend details of artificial den size and structure.

Current Conditions

Most of the LAUs containing DNR-managed land currently meet the overall forested habitat quantity ratio but are deficient in Forage Habitat (Chapter 4). Potential Denning Habitat is available in most areas, but will require future field checks to determine the actual quantity present. Areas have been identified for future surveys.

Plan Feasibility
Computer-modeled projections of lynx habitat components within the four LAU where DNR-manages more than 20% of the LAU confirm that DNR will maintain a minimum of 70% Forested Habitat per LAU through the 80 year planning period. The minimum 20% Forage Habitat ratio was not met in most planning periods, but this result is a likely result of conservative estimates of Forage duration. Potential Denning Habitat was available throughout the planning period, and a general trend with in each LAU toward more evenly distributed proportions of lynx habitat categories was observed.

Monitoring and Evaluation
DNR will monitor and evaluate the implementation and effectiveness of this Lynx Habitat Management Plan (Chapter 6). For implementation monitoring, 1) forest management activities will be reported, 2) field surveys of representative management activities will be conducted, and 3) LAU-level lynx habitat conditions will be updated. For effectiveness monitoring, representative stands will be sampled to 1) verify their suitability as forage, travel, and denning habitat, and 2) assess snowshoe hare use of stands. DNR will provide WDFW with an annual report describing these monitoring activities.

After the completion of the first field season of monitoring, DNR will meet with WDFW to discuss results pertaining to a) post-harvest conditions in Travel Habitat, b) development of Forage Habitat, and c) the suitability of areas classified as Denning Habitat. . Subsequently, evaluations of this plan will occur at five year intervals so that new information and monitoring results can be adapted into this plan. Changes to the plan that are prompted by the evaluations will be made by mutual agreement of DNR and WDFW.

About this Document...

Section One: Context and Foundation

1. INTRODUCTION... introduces the species of concern, highlights the planning context, and identifies the planning considerations that influenced this document.

2. PATTERNS OF HABITAT USE BY LYNX AND SNOWSHOE HARE... familiarizes the reader with what is known and unknown about lynx and hare habitat relationships. Topics covered range from stand to landscape scales, forming the foundation from which the lynx management plan was derived.

Section Two: Management Plan

3. DEFINITIONS, MANAGEMENT STRATEGY, AND HABITAT RATIOS... contains the standards used to judge current conditions of lynx habitat and guidance used to direct future activities on DNR-managed lands within lynx range.

4. CURRENT CONDITIONS AND MANAGEMENT DIRECTION... Lynx Analysis Units containing DNR-managed land are identified, current conditions of lynx habitat is analyzed, and future management direction is given.

5. FUTURE CONDITIONS: LOOMIS STATE FOREST & LITTLE PEND OREILLE BLOCK... contains computer-modeled projections of lynx habitat components within four Lynx Analysis Units through the 80 year planning period, reflecting the guidance and standards developed in the previous chapter.

6. MONITORING & EVALUATION... describes evaluation and monitoring of planned activities.